II. Solution by J. C. NAGLE, M. A., M. C. E., Professor of Civil Engineering in Agricultural and Mechanical College of Texas, College Station, Texas.

The sum of the weights of the rods will be a minimum when their areas are a minimum, which will occur when the stresses are made a minimum. By resolution of forces we have for the sum of the three stresses in ab, bc and ac, calling the equal angles θ: sum of stresses equals

$$L\left(\frac{1}{\sin\theta}-\frac{1}{2}\frac{\cos\theta}{\sin\theta}\right).$$

Equating the first derivative to zero, we get, after reduction, $\cos\theta=\frac{1}{2}$. Therefore $\theta=60°$ and the triangle is equilateral.

65. Proposed by G. B. M. ZERR, A. M., Ph. D., President and Professor of Mathematics, The Russell College, Lebanon, Va.

The distance. parallel to the axis, from the mid-point of a chord to the arc of a parabola, is constant. Show that the center of gravity of all segments formed by the chord is an equal parabola.

I. Solution by the PROPOSER.

Let A be the vertex of the segment ; (h, k) its coördinates ; $5b$ the constant length from A to the center of the chord ; θ the inclination of the chord to the axis ; $y^2=4ax$, the equation to the parabola ; (m, n) the coördinates of the center of gravity of the segment.

Then $h=m=a\cot^2\theta$, $n=k+3b=2a\cot\theta+3b$.

$\therefore\ \cot\theta=[(n-3b)/2a]=\sqrt{(m/a)}$.

$\therefore\ m/a=[(n-3b)/2a]^2$. Let $n=p+3b$.

$\therefore\ p^2=4am$, an equal parabola.

II. Solution by GEORGE LILLEY, Ph. D., Professor of Mathematics, University of Oregon, Eugene, Ore.

Take the diameter through the mid-point and the tangent at its extremity for axes.

Then $y^2=4cx$, where θ is the angle between the axes and $c=a/\sin^2\theta$.

Since the diameter bisects the area of the segment,

$$x=\frac{\int_o^k 2x\sqrt{(cx)}dx}{\int_o^k 2\sqrt{(cx)}dx}=\tfrac{3}{5}k\ ;\ y=0,$$

where k is the distance from the arc to the mid-point.

But $x=a\cot^2\theta+\frac{3}{5}k$; $y=2a\cot\theta$, referred to the vertex and rectangular axes.

$\therefore\ (y)^2=4a(x-\frac{3}{5}k)$ or $y^2=4a(x-\frac{3}{5}k)$, which is the equation of an equal parabola with its vertex on the axis at a distance $\frac{3}{5}k$ from the given one.

Also solved by *J. SCHEFFER*.